Table 1.
Satellite Transmit Characteristics

Transmit Frequency	Satellite Antenna Diameter	RF Power/ Beam, watts	Satellite Transmit Antenna Gain, dBi	EIRP/ Beam, dBw
868 MHz	10 meter	139.1	35.5	54.5
868 MHz	15 meter	75.7	39	55.4
868 MHz	20 meter	17.5	41.5	51.5
1551.5 MHz	5 meter	163.1	35.5	55.2
1551.5 MHz	10 meter	46.9	41.5	55.8
1551.5 MHz	15 meter	12.8	45	53.7

Table 2.
Required EIRP/Channel, dBw

		Mobile Antenna Gain		
Frequency	Excess Path Loss	4 dBi	10 dBi	13 dBi
868 MHz	6 dB	36.8	30.8	27.8
868 MHz	10 dB	40.8	34.8	31.8
1551.5 MHz	6 dB	41.8	35.8	32.8
1551.5 MHz	10 dB	45.8	39.8	36.8

Table 3.
Number of Power-Limited Channels per Beam

Transmit Frequency	Satellite Ant. Diameter	6 dB 4 dBi	6 dB 10 dBi	6 dB 13 dBi	10 dB 4 dBi	10 dB 10 dBi	10 dB 13 dBi	Excess Path Loss Mobile Ant. Gain
868 MHz	10 meter	148	589	1176	59	235	468	
868 MHz	15 meter	180	718	1433	72	286	570	
868 MHz	20 meter	74	295	589	30	118	234	
1551.5 MHz	5 meter	55	218	435	22	87	173	
1551.5 MHz	10 meter	63	249	498	25	99	198	
1551.5 MHz	15 meter	38	152	304	15	61	121	

Table 4.
Forward Link Power Budget
10 Meter L-Band Configuration
10 dBi Mobile Antenna, 6 dB Excess Path Loss

A. Satellite EIRP, dB			35.8
1) Transmitter Power/Channel, dBw		-3.3	
Transmitter Power/Channel, watts	0.47		
2) Transmitter Circuit Loss, dB		-2.4	
3) Antenna Gain, dBi		41.5	
B.. Space Loss, dB			-188.3
Frequency, MHz	1551.500		
Range, Km	40000		
C. Edge-Of-Beam Loss, dB			-4
D. Polarization Loss, dB			-0.4
E. Excess Path Loss, dB			-6
F. Mobile Earth Station Antenna Gain, dBi			10
F. Received Power, dBw	A+B+C+D+E+F	-152.9	
G. Receiving System Temperature, dBK		27.1	
1) Receiving Circuit Loss, dB	-1.50		
2) Receiver Noise Figure, dB	1.50		
3) Antenna Noise Temperature, K	220.00		
4) System Noise Temperature, K	508.63		
H. Mobile Earth Station G/T, dB/K	F-G	-17.1	
I. Boltzmann's Constant, dBw/HzK		-228.6	
J. Receiver Noise Density, dBw/Hz	G+I		-201.5
K. Downlink C/No, dB-Hz	A+B+C+D+E+F-J		48.7
L. Intermodulation and Interference Losses, dB			-0.7
M. Effective C/No, dB-Hz	K+L		48.0
N. Required C/No, dB-Hz			45.0
O. Performance Margin, dB	M-N		3.0

Table 5.
Forward Link Power Budget
10 Meter UHF Configuration
10 dBi Mobile Antenna, 6 dB Excess Path Loss

A. Satellite EIRP, dB			30.8
1) Transmitter Power/Channel, dBw		-2.3	
Transmitter Power/Channel, watts	0.59		
2) Transmitter Circuit Loss, dB		-2.4	
3) Antenna Gain, dBi		35.5	
B.. Space Loss, dB			-183.3
Frequency, MHz	868.000		
Range, Km	40000		
C. Edge-Of-Beam Loss, dB			-4
D. Polarization Loss, dB			-0.4
E. Excess Path Loss, dB			-6
F. Mobile Earth Station Antenna Gain, dBi			10
F. Received Power, dBw	A+B+C+D+E+F	-152.9	
G. Receiving System Temperature, dBK		27.1	
1) Receiving Circuit Loss, dB	-1.50		
2) Receiver Noise Figure, dB	1.50		
3) Antenna Noise Temperature, K	220.00		
4) System Noise Temperature, K	508.63		
H. Mobile Earth Station G/T, dB/K	F-G	-17.1	
I. Boltzmann's Constant, dBw/HzK		-228.6	
J. Receiver Noise Density, dBw/Hz	G+I		-201.5
K. Downlink C/No, dB-Hz	A+B+C+D+E+F-J		48.7
L. Intermodulation and Interference Losses, dB			-0.7
M. Effective C/No, dB-Hz	K+L		48.0
N. Required C/No, dB-Hz			45.0
O. Performance Margin, dB	M-N		3.0

Table 6.
Forward Link Power Budget
10 Meter L-Band Configuration
Transportable Antenna, No Excess Path Loss

A. Satellite EIRP, dB			18.8
1) Transmitter Power/Channel, dBw		-20.3	
Transmitter Power/Channel, watts	0.0094		
2) Transmitter Circuit Loss, dB		-2.4	
3) Antenna Gain, dBi		41.5	
B.. Space Loss, dB			-188.3
Frequency, MHz	1551.500		
Range, Km	40000		
C. Edge-Of-Beam Loss, dB			-4
D. Polarization Loss, dB			-0.4
E. Excess Path Loss, dB			0
F. Mobile Earth Station Antenna Gain, dBi			21
F. Received Power, dBw	A+B+C+D+E+F	-152.9	
G. Receiving System Temperature, dBK		27.1	
1) Receiving Circuit Loss, dB	-1.50		
2) Receiver Noise Figure, dB	1.50		
3) Antenna Noise Temperature, K	220.00		
4) System Noise Temperature, K	508.63		
H. Mobile Earth Station G/T, dB/K	F-G	-6.1	
I. Boltzmann's Constant, dBw/HzK		-228.6	
J. Receiver Noise Density, dBw/Hz	G+I		-201.5
K. Downlink C/No, dB-Hz	A+B+C+D+E+F-J		48.7
L. Intermodulation and Interference Losses, dB			-0.7
M. Effective C/No, dB-Hz	K+L		48.0
N. Required C/No, dB-Hz			45.0
O. Performance Margin, dB	M-N		3.0

Figure 1.
L-Band Downlink
Spectrum Requirements
6 dB Excess Path Loss

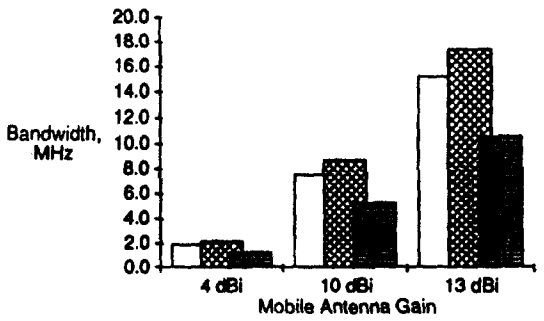
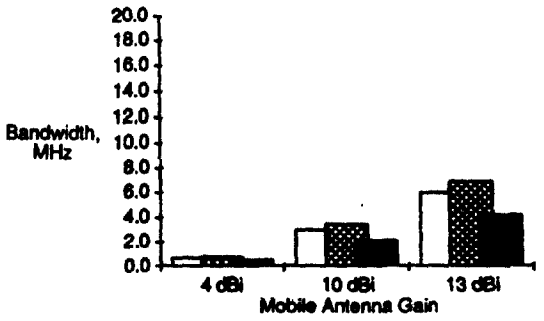


Figure 2.
L-Band Downlink
Spectrum Requirements
10 dB Excess Path Loss



Satellite Antenna Diameter

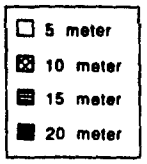


Figure 3.
L-Band Downlink
Spectrum Requirements
Transportable Antenna

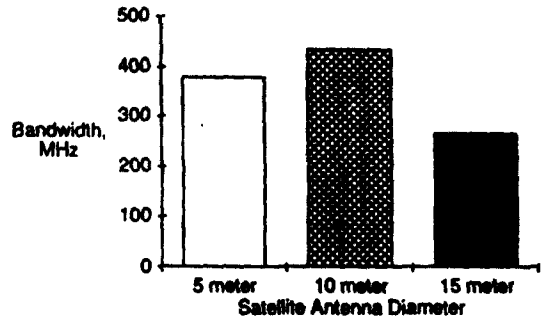


Figure 4.
UHF Downlink
Spectrum Requirements
6 dB Excess Path Loss

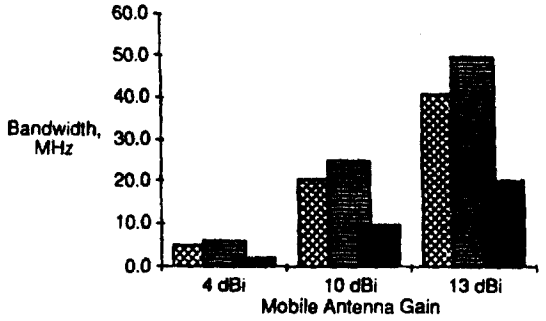


Figure 5.
UHF Downlink
Spectrum Requirements
10 dB Excess Path Loss

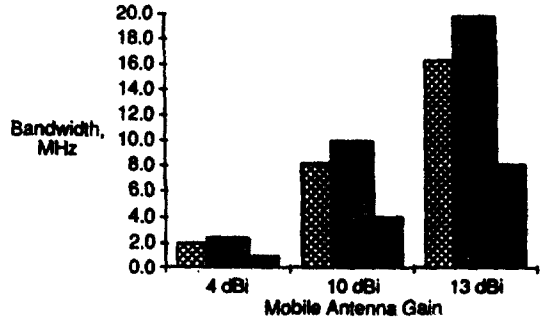
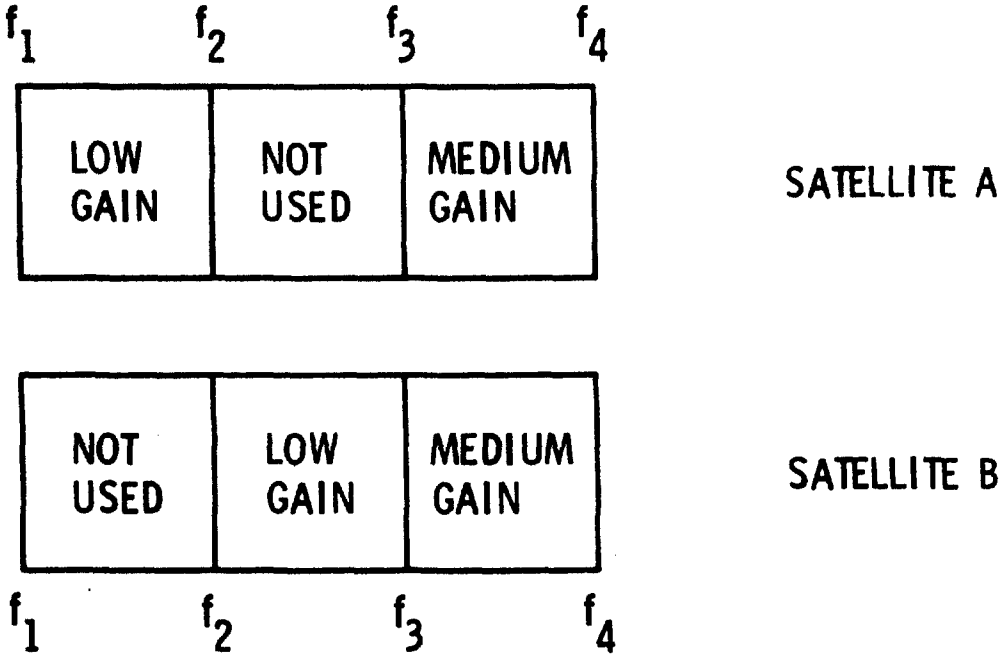
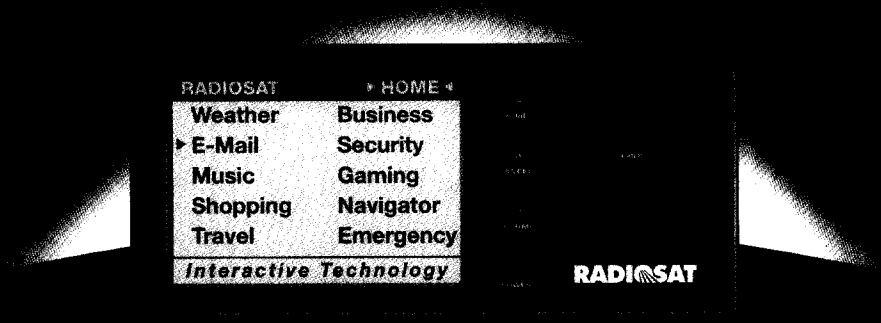


Figure 6.
Possible Frequency Plan



RadioSat Is About To Revolutionize The Driving Experience.



And It's All At The Push Of A Button

The car electronic revolution is about to begin.

Radio Satellite Corporation will soon introduce its technological breakthrough — RadioSat — an interactive radio system that fits neatly under the dash of your car or into any vehicle. This device looks like a car radio with a Liquid Crystal Display (LCD). What it delivers is truly remarkable.

A mobile "digital sound theater," RadioSat receives new continentwide Digital Audio Broadcast (DAB) transmissions from satellites and AM/FM/DAB transmissions from local radio stations. You can hear a wide variety of audio programs no matter where you are. Purchase CD's and tapes with the push of a button.

RadioSat transforms your car into a weather station, a shopping mall, a business center, a communications and security center, a casino, a navigator, a travel agency, a life saver and more — much more. The possibilities are endless.

RadioSat uses existing satellite navigation and communication technology to send and receive information in your car. RadioSat's patented "order" button will enable you to purchase goods and services from your car and respond to listener polls. You can communicate as never before.

Potential RadioSat Users:

Automobiles

Emergency vehicles

Commercial and residential buildings and portable radios

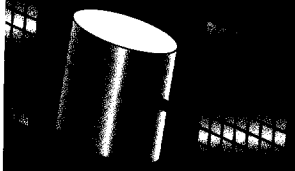
Road and rail transport

Aviation

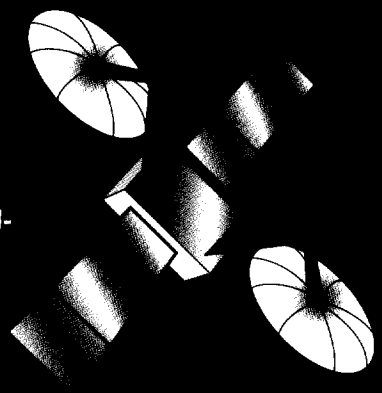
Maritime

Military air, land and sea vehicles

RadioSat integrates five key elements into one system

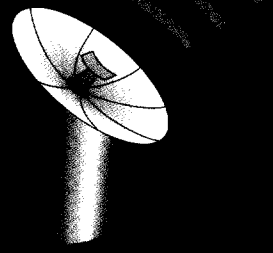


Global Positioning System (GPS) for precision navigation



Mobile Satellite Service (MSS) and Digital Audio Broadcast (DAB) satellites transmit audio and data broadcasts and relay two-way communications

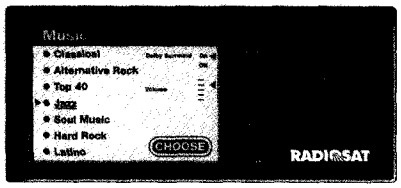
RadioSat Network Center



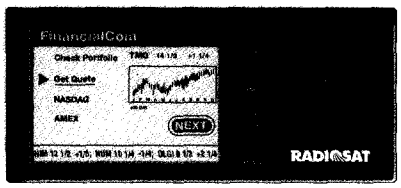
AM/FM and Digital Audio Broadcast stations

RadioSat-equipped vehicle (receives and transmits)

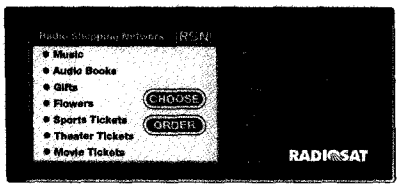
What Can RadioSat Do?



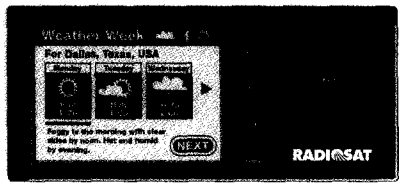
Satellite Digital Audio Broadcast And Local AM/FM/DAB Stations



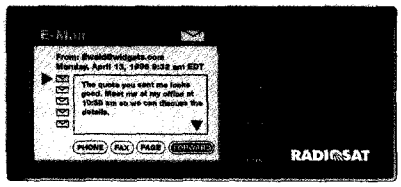
Mobile Business Center



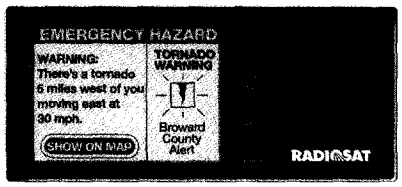
Radio Shopping Network



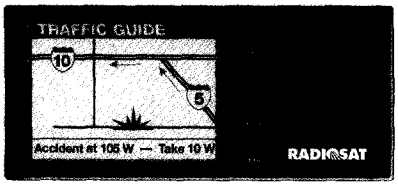
Weather, News And Sports



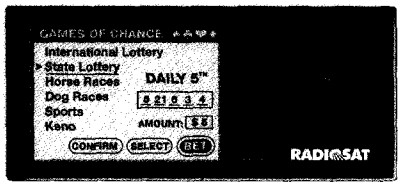
Secure E-mail, Fax And Phone Communications



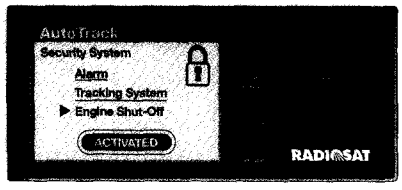
Emergency Alert



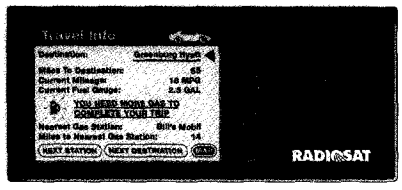
Real-time Traffic Information And Digital Map



Wireless Games



Automobile Security And Tracking



Travel Information And Reservations

RADIOSAT

Intelligent Radio.

Radio Satellite Corporation
P.O. Box 93817, Pasadena, CA 91109-3817
tel: (818) 790-1465 fax: (818) 790-2152 E-mail: radiosat@radiosat.com

Test-drive a virtual prototype of RadioSat on Radio Satellite Corporation's

Exceptional features of RadioSat include:

Digital Audio Broadcast (DAB) – Receives new, crystal-clear Digital Audio Broadcasts sent through satellites directly to your car. Also receives AM/FM/DAB transmissions from local radio stations.

Radio Shopping Network – Purchase products and services you hear about on the radio with the push of a button.

Entertainment Network – Listen to commercial-free audio programs on a subscription or pay-per-listen basis. Select Books-On-Radio, learn a foreign language, listen to motivational lectures, classical literature and much, much more.

Mobile Business Center – Access and act on information on business and financial markets. Buy and sell stocks and other securities from your car.

Personal Communications – Integrated two-way paging, E-mail, voice mail, telephone and fax. Transmissions can be sent to individuals or to defined groups. Interfaces with popular electronic organizers.

Emergency Communications – Send preprogrammed emergency messages ("out of gas," "need a tow," "car won't start," etc.) via satellite to a roadside assistance organization. Also send preprogrammed messages for police, fire or medical assistance. Vehicle location is automatically appended to each emergency message so that emergency workers can be sent directly to the vehicle requesting assistance.

Government Communications – Government agencies can send emergency alerts and other information to everyone within a defined group, to everyone in a defined geographic area or to everyone everywhere.

Navigation – Display precise vehicle location on a digital map.

Automatic Routing – Receive traffic information as it happens. RadioSat automatically determines the shortest route to your destination, maneuvering you around accidents and other traffic disruptions.

AutoTrack – Track your car using your home computer. Police can track your car if it is lost or stolen.

Travel Services – Get information about hotels, stores, theaters, restaurants, museums and sporting events, and make reservations at the push of a button.

Weather, News And Sports – Get the latest news, sports reports and weather forecasts on demand.

Secure Tracking And Communications – Send secure messages, voice and fax transmissions to individuals or to any defined group. Commercial organizations, governments and the military will be able to track and communicate with their vehicles anywhere in the world at very low cost and with unmatched security.

Wireless Games – Buy lottery tickets, bet on sports and play your favorite games of chance.

Polls And Voting – Respond to listener polls with the press of